

**REMARKS**

This amendment is submitted in response to the Office Action mailed on 11 July 2005.

5 Reconsideration of the claims with an eye toward allowance is respectfully requested.

Applicant notes that the examiner has indicated that Claims 2-10, 15-20, 22-25, and 27 are allowed. Claim 37 was objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim 10 and any intervening claims. Although Applicant submits that the remarks and amendments to claim 1 from which claim 37 depends places both claim 1 and claim 37 in condition for allowance, Applicant has amended claim 37 to place it in independent form and trusts that the rejection to claim 37 will be withdrawn.

15 The Examiner has suggested that Claims 11-14, 28-36, and 39-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. More particularly, the Examiner suggests that with reference to claims 11-14 and 39, the limitation of “time reversing and complex conjugating the second symbol streams to form a third symbol stream; and filtering the first symbol stream and the third symbol stream to form decoupled 20 outputs” as recited in claim 11 lines 7-11, is not been taught in the specification. Rather, that the specification only teaches “Said receiver receiving the symbol streams in the first and second blocks of the transmission frames and time reversing and taking the complex conjugate form of the symbol stream in the second block and filtering the symbol stream in the first block and the time reversed complex conjugate of the symbol streams in the second block to form decoupled 25 outputs” as recited in page 4 lines 14-18.

Applicant submits that the language in claims 11-14 and 39 is supported by the specification, drawings, and claims as originally filed. Without admitting the propriety of this rejection, Applicant notes that the examiner does not indicate the particular portion of

independent claim 11 on which the 35 U.S.C. 112, first paragraph, rejection is based; nor does the Examiner indicate if the rejection of dependent claims 12-14 and 39 flow from the rejection of base claim 11 or from other language within these dependent claims. Applicant further notes that the introduction of "a third symbol stream" merely places a convenient label on the symbol stream formed from the "time reversing and complex conjugating [of] the second symbol stream". No new subject matter was introduced by this label and its use not only simplified the language in claim 11, but also simplified the recitation in claim 12. However, as this Amendment is made in response to a final rejection and Applicant prefers to overcome this rejection as expeditiously as possible, Applicant has amended claims 11 and 12 to conform with the words in the application as filed and not introduce additional labels. Applicant has also deleted the word "pre-transmission" from the claims as the word is not required to define the particular symbol streams or the subject matter the inventor believes to be the invention. For the record, Applicant submits that the specification and drawings make it clear that these "pre-transmission" symbol streams are present in the transmitter prior to generation or transmission of the transmitted signal. Therefore, to characterize or label them as pre-transmission is accurate and does not add new matter.

With reference to claims 28-33, and again without admitting the propriety of the rejection, Applicant has made similar amendments to these claims to avoid the rejection and trusts that the rejection on this basis will be withdrawn.

With reference to claims 34-36 and 40-43, the Examiner suggests that the limitation of "receiving a plurality of symbol sequences each comprising symbols from a plurality of pre-transmission symbol streams" as recited in claims 34 and 41, lines 3-4, has not been taught in the specification.

Applicant has, without admitting the propriety of the rejection, amended the claims to delete the term "pre-transmission" and to conform the subject matter to that disclosed in the

application as filed. Applicant trusts that with these amendments, the rejection of claims 34-36 and 40-43 will be withdrawn.

**35 USC § 102 Claim Rejections**

5        The examiner has rejected claims 1 and 38 under 35 U.S.C. 102(e) as being anticipated by Jones et al. (US 6,128,351). With particular reference to Claim 1, the examiner suggests that Jones et al. discloses in Fig. 4 a method for bi-directional demodulation of digital modulated signals comprising steps of: a method of transmitting a signal having a sequence of symbols (Fig. 4 elements 62-64) through at least one channel with inter-symbol interference (column 4  
10 lines 22-38), comprising the steps of: dividing the sequence of symbols to form a plurality of symbol streams (Fig. 4 elements 68-70 and column 6 lines 11-14); and processing the plurality of symbol streams before transmitting each symbol stream through a channel (Fig. 4 elements 68-70 and column 6 lines 11-14), wherein processing the plurality of symbol streams comprises time-reversing at least one of the symbol streams (Fig. 4 elements 68-70, column 1 lines 14-29, and column 4 lines 39-58).

With reference to Claim 38, the Examiner suggests that Jones et al teaches "wherein processing the plurality of symbols streams further comprises complex conjugating at least one of the symbol streams" (Fig. 4 elements 68-70, column 1 lines 14-29, and column 4 lines 39-58).

20        Applicant first notes that Jones is directed to OFDM for peak power control, whereas the instant invention involves a MIMO technique and diversity. Applicant therefore submits that Jones cannot attain a diversity effect and does not disclose or suggest the claimed invention. Secondly, Jones describes a different approach to dividing a sequence wherein the sequence is  
25 divided orthogonally in Jones. In the instant invention, the sequence is divided but not orthogonally and then later the sequences are made to be orthogonal. A further difference is that Jones at most suggests that the time reversal means performs a convolution function. Each of these differences as well as other differences may separately form a basis of overcoming the rejection over Jones.

Given the final rejection stage of prosecution and with the allowability of many claims having been determined, Claim 1 has been amended so that it now clarifies that the processing includes “processing the plurality of symbol streams before transmitting each symbol stream through a channel, wherein processing the plurality of symbol streams comprises time-reversing 5 at least one of the symbol streams before transmitting the at least one of the processed symbol streams.” Not only does the invention prepare a time reversed symbol stream but we also transmit it. Jones et al does not disclose or suggest this element.

As remarked in Applicant’s prior response, Jones does not disclose processing a plurality 10 of symbol streams by time-reversing at least one of the symbol streams and transmitting them. In Jones, the data stream 63 is converted into parallel data words 75 (Col. 4, lines 8-11). The data words 75 are sent to a modulator 66, which generates output signatures 72 using an inverse Fast Fourier Transform function. The output signatures are not sequences of data but are shapes generated by the modulator 66 and the matched filters in response to receiving the data words 75 15 (Col. 4, lines 11-13 and lines 41-47). It is the filter characteristics that are generated from the time-reversed version of the signals emanating from the code words to be transmitted, not the data streams themselves, that are time-reversed and complex conjugated in Jones (Col. 4, lines 13-14, lines 39-54, lines 59-65, and FIG. 5). Since the data streams in Jones are not time-reversed before transmission, the transmitted data stream can be received by a conventional 20 multicarrier receiver 88, which does not include a time-reversal function (Col. 5, lines 60-63 and FIG. 6). Therefore, Applicant again submits that claims 1 and 38 as amended are patentable over Jones.

The examiner has provided a statement of reasons for allowance of at least some of the 25 allowed claims prior to the submission of the instant amendments and remarks. Applicant submits that while the statement by the examiner represents one possible reason for allowance, other patentable distinctions are now presented that differentiate the claimed invention from Jones et al and therefore that other bases of patentability pertain to the claims already identified as being allowable as well as to the other pending claims.

Applicant has also amended the drawings to correct a typographical error beginning at page 5, line 11, wherein the phrase "an analog-to-digital converter" is replaced by the phrase --a digital-to-analog converter--. Applicant submits that it is clear from the description that digital-to-analog converter is required to convert the "digital signals from the space-time encoder" to "analog signals" which are "upconverted to radio frequency" as described in the specification.

Additionally, Applicant has amended Figure 6 to correct a typographical error wherein one instance of the mathematical expression  $r_1(t)$  is replaced with  $r_2(t)$  to conform to the description in the specification and claims as originally filed. A substitute drawing sheet and a drawing sheet showing the proposed amendment are attached following the signature page of this Amendment.

In view of the foregoing, it is respectfully submitted that the claims of record are allowable and that the application should be passed to issue. Should the Examiner believe that the application is not in a condition for allowance and that a telephone interview would help further prosecution of this case, the Examiner is requested to contact the undersigned attorney at the phone number below.

While Applicant believes that no further fees are due at this time, the Commissioner is authorized to charge any fees that may be due as a result of filing this Amendment, including additional claims fees not already paid for, fees for the requested Petition for Extension of Time, or other fees that have not been separately paid, to Deposit Account 50-2319 (Order No. A-69116/RMA (468330-1288)).

Appl. No. 09/833,543  
Amdt. dated November 10, 2005  
Reply to Office Action of July 11, 2005

Applicant submits the claims are in condition for allowance, and notification of such is respectfully requested. If after review, the Examiner feels there are further unresolved issues, the Examiner is requested to call the undersigned at (650) 857-1717 to discuss how the application may be put into condition for allowance given the allowable subject matter.

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Respectfully submitted,

DORSEY & WHITNEY LLP

By

  
R. Michael Ananian, Reg. No. 35,050

Attorney for Applicants

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Customer No. 32940  
555 California Street, Suite 1000  
15 San Francisco, California 94104-1513  
Tel.: (650) 857-1717  
Fax: (650) 857-1288

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**Amendments to the Drawings:**

An amendment to Figure 6 of the drawings wherein one instance of the mathematical expression  $r_1(t)$  is replaced with  $r_2(t)$  to conform to the description in the specification and claims as originally filed. A substitute drawing sheet and a drawing sheet showing the proposed amendment are attached following the signature page of this Amendment.